Navy Environmental & Preventive Medicine Unit No. 2
1887 Powhatan St.
Norfolk, VA 23511-3394
(757) 444-7671

02 October 2001

Medical Force Protection: Suriname

Medical Force Protection countermeasures required before, during, and after deployment to Ecuador are as follows:

Major Threats

Diarrheal disease, viral hepatitis A, typhoid and paratyphoid fever, malaria, dengue fever, Venezuelan Equine Encephalitis, leishmaniasis, sexually transmitted diseases, rabies (primarily from stray dogs), heat injury, industrial pollution, and altitude sickness (central region).
Presume local water sources are not safe for drinking.

Requirements before Deployment

1. **Before Deploying report to Medical to:**
   a. Ensure your Immunizations are up to date, specific immunizations needed for area: **Hepatitis A, MMR, Typhoid, Yellow fever, Tetanus (Td), and Influenza.**
   b. If you have not been immunized against Hepatitis A (two dose series over 6 months) get an injection of Immunoglobulin with the initial Hepatitis A dose.
2. **Malaria Chemoprophylaxis**: **:** Risk in all areas of the interior. Sporadic cases have also been reported along the coastal region.. Drug resistant strains are present in some locales (chloroquine and possibly Fansidar).

   Recommended regimen: Mefloquine 250mg per week begun 2 weeks prior to entering country and continued weekly until 4 weeks after return from country.

   Personnel in flight status: Doxycycline 100mg per day begun 2 days before entering country. Continue daily while in country and until 28 days after return.

   Terminal prophylaxis (for both chemoprophylaxis regimens)**: Primaquine 15 mg per day** for 14 days starting on day of departure from country of risk**. G6PD status must be determined prior to starting Primaquine.**
3. **Get HIV testing if not done in the past 12 months.**
4. **Complete attached Pre-Deployment Screening form and turn into your Medical Section.**
5. **Make sure you have or are issued from unit supply: DEET, permethrin, bednets/poles, sunscreen and lip balm. Treat utility uniform and bednet with permethrin.**

Requirements during Deployment

1. Consume food, water, and ice only from US-approved sources; **"Boil it, cook it, peel it, or forget it"**.
2. Involve preventive medicine personnel with troop campsite selection.
3. Practice good personal hygiene, hand-washing, and waste disposal.
4. Avoid sexual contact. If sexually active, use condoms.
5. Use DEET and other personal protective measures against insects and other arthropod-borne diseases. Personal protective measures include but are not limited to proper wear of uniform, use of bed nets, and daily "buddy checks" in tick and mite infested areas.
6. Continue malaria chemoprophylaxis.
7. Minimize non-battle injuries by ensuring safety measures are followed. Precautions include hearing and eye protection, enough water consumption, suitable work/rest cycles, and acclimatization to environment and stress management.
8. Eliminate food/waste sources that attract pests in living areas.
9. Avoid contact with animals and hazardous plants.
10. Consider **Acetazolamide (Diamox) 250 mg every 6 – 12 hours** for 1 – 2 days before ascent and continued for 48 hours **if traveling to elevations >2,500 meters** .

Requirements after Deployment

1. Continue malaria chemoprophylaxis.
2. Begin terminal malaria prophylaxis as described above.
3. Receive preventive medicine debriefing after deployment.
4. Seek medical care immediately if ill, especially with fever.
5. Get HIV and PPD testing as required by your medical department or Task Force Surgeon.

SURINAME
VECTOR RISK ASSESSMENT PROFILE
(VECTRAP)

Prepared by: **Navy Disease Vector Ecology and Control Center**
Naval Air Station, Jacksonville, FL 32212-0043
MSG ADDRESS: **NAVDISVECTECOLCONCEN JACKSONVILLE FL//MEI//**
PH: (904) 542-2424; DSN: 942-2424
FAX: (904) 542-4324; DSN FAX: 942-4324

1. GEOGRAPHY: **Area** of 163,265 sq km (63,037 sq mi), slightly larger than Georgia. ***Capital City*** - Paramaribo (pop 180,000). **Terrain** varies from coastal swamps to savanna, to hills. **Climate** is tropical.

2. VECTOR-BORNE DISEASES:

a. **Malaria**: *Plasmodium falciparum* and *P. vivax* are present. *P. falciparum* accounts for more than 85% of the cases, and the incidence of both is steadily increasing. Only the city of Paramaribo, a narrow strip along the Atlantic coast, and areas of the interior above 1,300 meters elevation are considered risk-free. Incidence increased during the mid- and late 1980s, with official annual case totals varying from 1,500 to nearly 4,000 (at-risk population estimated at 300,000). In mid-1987, up to 30 percent of the population in upper Saramacca District was believed to be malaria-infected. Falciparum malaria accounts for about 80 to 90 percent of reported cases, with vivax malaria accounting for the remainder. Chloroquine resistant *P. falciparum* (CRPF) is reported country-wide. Fansidar resistant *P. falciparum* is reported in the interior regions only. The risk of acquiring malaria is considered high without the proper chemoprophylaxis and would result in a serious loss of combat effectiveness.

b. **Dengue fever** is present at unknown levels of endemicity country-wide, but is more prevalent along coastal areas. Limited dengue fever virus transmission apparently occurred during late 1989 and early 1990. Although dengue virus serotypes 1, 2, and 4 have circulated actively in the Caribbean region since the mid-1980s, dengue activity in Suriname remained relatively low into the late 1980s. A fairly extensive outbreak involving dengue 1 and 4 occurred in the Paramaribo area during 1982, and the potential exists for large outbreaks to occur. As with most Latin American countries, the potential for a major dengue fever outbreak is high. The risk of acquiring dengue is considered moderate. Once acquired, dengue would seriously reduce combat effectiveness.

c. Arboviral fevers: At least 6 distinct viral agents (**Caraparu, Guama, Mayaro, Mucambo, Oriboca, and Restan viruses**) associated with human illness have been detected in Suriname, but incidence data are not available. The area of greatest risk from these agents appears to be the savanna area located 20 to 40 kilometers inland from the coastal strip.

d. **Leishmaniasis**: Risk of leishmaniasis presumably exists in most forested areas of the interior. Recent incidence data are not available. During the early 1980s, 65 to 130 cases were reported annually from among an at-risk population estimated at 32,900. Most cases presumably were cutaneous (known locally as "bush yaws" or "pian bois") or mucocutaneous, both caused by members of the *Leishmania braziliensis* complex. Some infections caused by members of the *L. mexicana* complex also may occur. These organisms usually cause cutaneous leishmaniasis, but can cause more disseminated infections, including mucosal involvement. The

zoonotic reservoir for *L. braziliensis* includes both ground level (rodents) and arboreal (edentates and marsupials) components, whereas *L. mexicana* is maintained almost entirely by ground dwelling rodent hosts.

e. **Schistosomiasis**: Risk probably elevated during the height of the rainy season (May through June); foci occur in the northern coastal strip from the Commewijne River west to the Nickerie River, with risk of infection apparently highest in Suriname and Saramacca Districts. All schistosomiasis in this region is intestinal, caused by *Schistosoma mansoni.* Although control efforts have been ongoing for many years, human factors (including agricultural practices and use of shell sand for road surfacing) have increased the areas suitable as habitats for the snail intermediate hosts. Accurate current incidence data are not available, but attack rates exceeding 15 percent were reported from foci in Suriname and Saramacca Districts during 1983.

f. **Bancroftian filariasis**: Vectored by *Culex* spp. mosquitoes. Limited risk may exist in urbanized areas of Brokopondo, Commewijne, and Suriname Districts and the city of Paramaribo.

g. **Leptospirosis**: Incidence of leptospirosis has continued to increase. Annual case totals have averaged fewer than 20 and had never exceeded 30 cases.

3. DISEASE VECTOR INFORMATION:

a. The main vectors of malaria are the mosquitoes, *Anopheles darlingi* and *An. aquasalis.* There is very little transmission of malaria where *An. darlingi* is not found (e.g., tidal regions). *An. nuneztovari* is a secondary vector of Malaria.

b. Dengue fever is transmitted by *Aedes aegypti*. This is a peridomestic mosquito that prefers to breed in artificial containers near human habitations. It is diurnally (i.e., daytime) active and feeds indoors or out, often biting around the neck or ankles. It typically rests indoors after feeding. *Aedes aegypti* is reported resistant to the insecticides DDT, Dieldrin and Lindane.

c. The sand flies, *Lutzomyia umbratilis* (readily attracted to artificial light sources) and *L. flaviscutellata* , are the vectors of leishmaniasis.

4. DISEASE AND VECTOR CONTROL PROGRAMS:

a. Prevention & Control: Malaria chemoprophylaxis should be mandatory. Consult the Navy Environmental Preventive Medicine Unit #2 in Norfolk, VA (COMM: 804-444-7671; DSN: 564-7671; FAX: 804-444-1191; PLAD: NAVENPVNTMEDU TWO NORFOLK VA) for the current chemoprophylaxis recommendations.

b. Yellow fever immunizations should be current.

c. The conscientious use of personal protective measures will help to reduce the risk of many vector-borne diseases. The most important personal protection measures include the use of DEET insect repellent on exposed skin, wearing permethrin-treated uniforms, and wearing these uniforms properly. The use of DEET 33% lotion (2 oz. tubes: NSN 6840-01-284-3982) during daylight and evening/night hours is recommended for protection against a variety of arthropods including mosquitoes, sand flies, other biting flies, fleas, ticks and mites. Uniforms should be treated with 0.5% permethrin aerosol clothing repellent (NSN 6840-01-278-1336), per label instructions. NOTE: This spray is only to be applied to trousers and blouse, <u>not</u> to socks, undergarments or covers. Reducing exposed skin (e.g., rolling shirt sleeves down, buttoning collar of blouse, blousing trousers) will provide fewer opportunities for blood-feeding insects and other arthropods. Additional protection from mosquitoes and other biting flies can be accomplished by the use of screened eating and

sleeping quarters, and by limiting the amount of outside activity during the evening/night hours when possible. Bednets (insect bar [netting]: NSN 7210-00-266-9736) may be treated with permethrin for additional protection.

d. The most important element of an *Aedes aegypti* control program is SOURCE REDUCTION. Eliminating or covering all water holding containers in areas close to human habitation will greatly reduce *A. aegypti* populations. Alternatively, containers may be emptied of water at least once a week to interrupt mosquito breeding. Sand or mortar can be used to fill tree holes and rock holes near encampments.

e. Because the breeding habitats of most sand fly species are not easily identified, not easily accessible, or unknown, control strategies focus mainly on adult sand flies. Peridomestic sand fly species can be controlled by spraying residual insecticides on buildings (including screening on portals of entry) animal shelters, and other adult resting sites. Area chemical control of sylvan sand fly species is impractical. Personal protective measures will reduce sand fly bites and environmental modification (e.g., clearing forests, eliminating rodent burrows/breeding sites, relocating domestic animals away from human dwellings) has been used to reduce local sand fly populations.

f. Expanded Vector Control Recommendations are available upon request.

5. IMPORTANT REFERENCES:

Contingency Pest Management Pocket Guide - Fourth Edition. Technical Information Memorandum (TIM) 24. Available from the Defense Pest Management Information Analysis Center (DPMIAC) (DSN: 295-7479 COMM: (301) 295-7479). Best source for information on vector control equipment, supplies, and use in contingency situations.

Control of Communicable Diseases Manual - Sixteenth Edition. 1995. Edited by A. S. Benenson. Available to government agencies through the Government Printing Office. Published by the American Public Health Association. Excellent source of information on communicable diseases.

Medical Environmental Disease Intelligence and Countermeasures - (MEDIC). September 1997. Available on CD-ROM from Armed Forces Medical Intelligence Center, Fort Detrick, Frederick, MD 21702-5004. A comprehensive medical intelligence product that includes portions of the references listed above and a wealth of additional preventive medicine information.

Internet Sites- Additional information regarding the current status of vector-borne diseases in this and other countries may be found by subscribing to various medical information sites on the internet. At the Centers of Disease Control and Prevention home page subscriptions can be made to the Morbidity and Mortality Weekly Report(MMWR)and the Journal of Emerging Infectious Diseases. The address is www.cdc.gov. The World Health Organization Weekly Epidemiology Report (WHO-WER) can be subscribed to at www.who.int/wer. The web site for PROMED is www.promedmail.org:8080/promed/promed.folder.home.
Although PROMED is not peer reviewed, it is timely and contains potentially useful information. The CDC and WHO reports are peer reviewed. Information on venomous arthropods such as scorpions and spiders as well as snakes, fish and other land animals can be found at the International Venom and Toxin Database website at www.uq.edu.au/~ddbfry/. Information on anti-venom sources can also be found at that site. Information on Poisonings, Bites and Envenomization as well as poison control resources can be found at www.invivo.net/bg/poison2.html.